Aerospace Technologies Panel

Naval - Industry R&D Partnership Conference

Robert W. Klein
Vice President
Engineering, Logistics & Technology
Integrated Systems Sector

August 14, 2001

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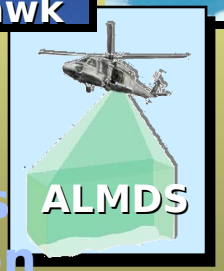
Sensor-to-Shooter Products

Sensor

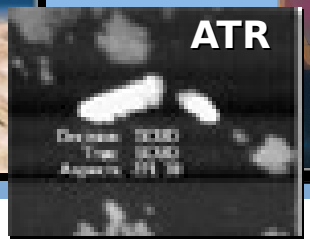
Network Centric

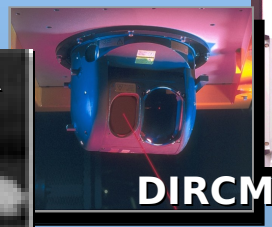
Shooter

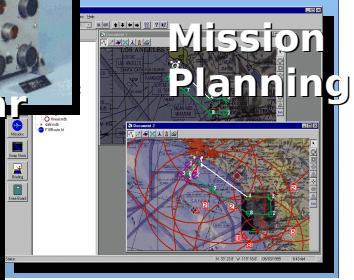


Advanced Systems Technology Insertion

Advanced Concepts







Advanced Leveraging Technology

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Alignment with Future Naval Capabilities

Future Naval Capabilities

ID	Information Distribution
TCS	Time Critical Strike
DSS	Decision Support System
MCM	Organic MCM
AO	Autonomous Operations
ASW	Littoral ASW
TOC	Total Ownership Cost
PP	Platform Protection
MD	Missile Defense
EL	Expeditionary Logistics
CM	Capable Manpower
WP	Warfighter Protection

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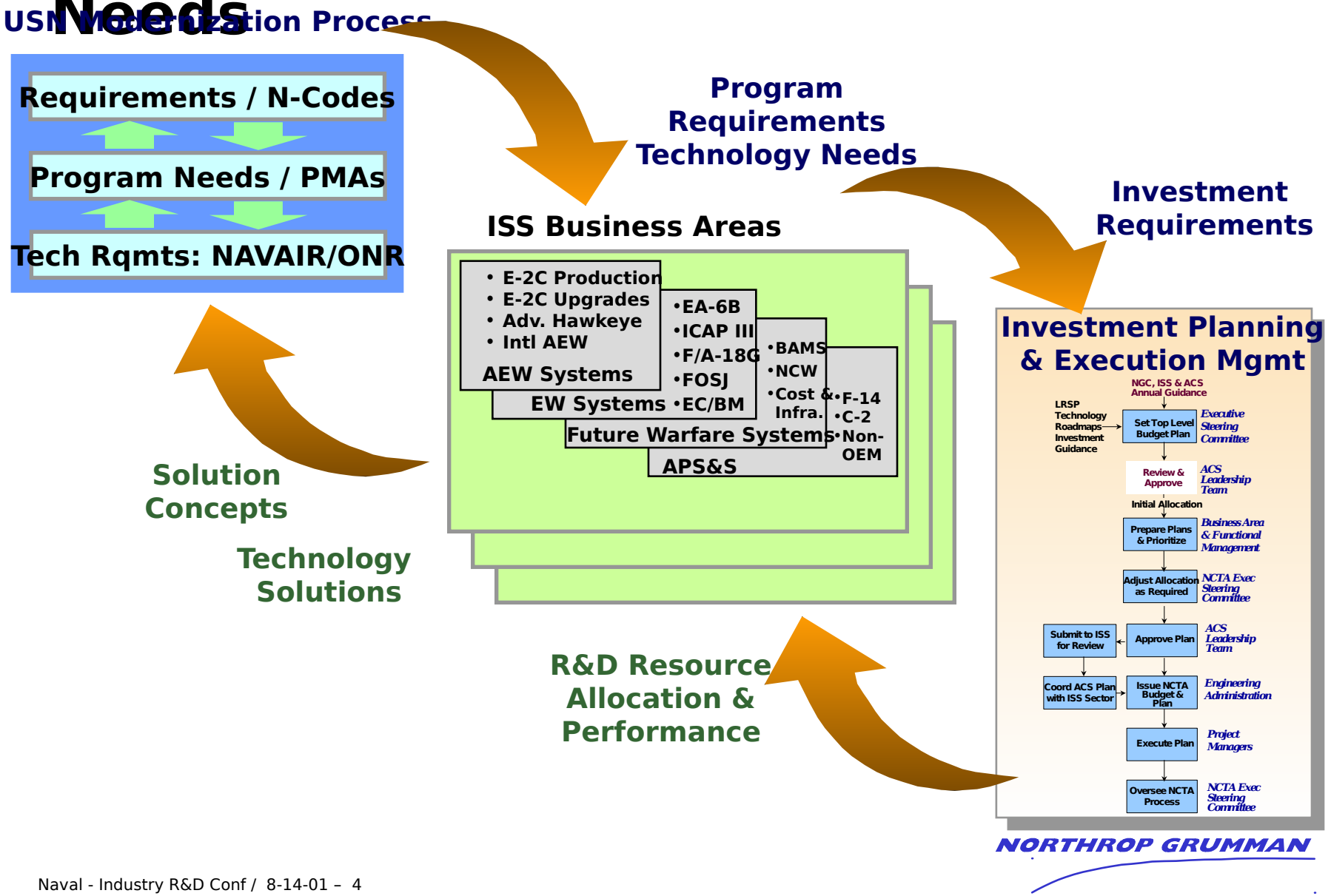
System & Technology Linkage to User Needs



Pre-Planned Product Improvement Plan

Objective

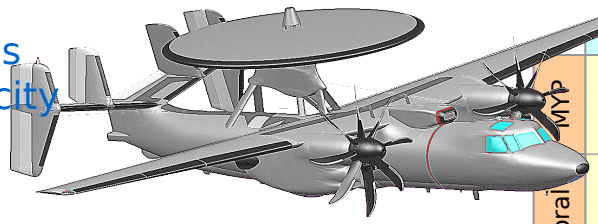
- **Field an affordable, low risk Littoral E-2C system with preplanned design modifications keyed to foreseeable technological breakthroughs (e.g. UESA) and expected changes in the war-fighters needs (CM/TBM tracking).**
- **Utilize a systematic and orderly acquisition strategy to facilitate evolutionary cost effective upgrading (growth) of the Advanced Hawkeye's Full TAMD System capabilities.**

Structure - attachment and support strength margins / volume allocated for SIRST, Growth, UESA, Enhanced ESM

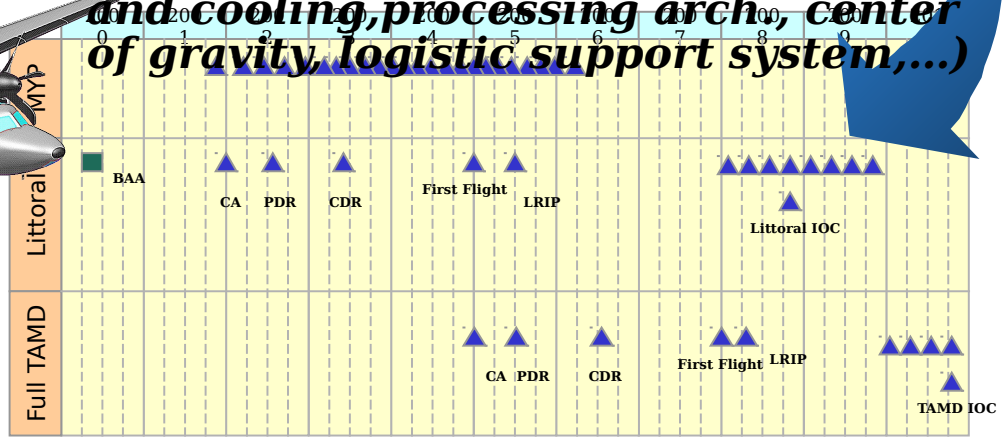
Power - Excess power generation (175/255) provides 25% growth capacity over Littoral.

Cooling - Liquid cooling upgrade under investigation. SiC Enabling tech.

Architecture - Open architecture, SWAP allocated. Modular layouts - software and hardware units partitioned into easily replaceable pieces



- ***Full-Up TAMD requirements must be clearly be stated in the requirements document and validated***
- ***P3I requires a highly disciplined configuration management (SWAP and cooling,processing arch, center of gravity, logistic support system,…)***



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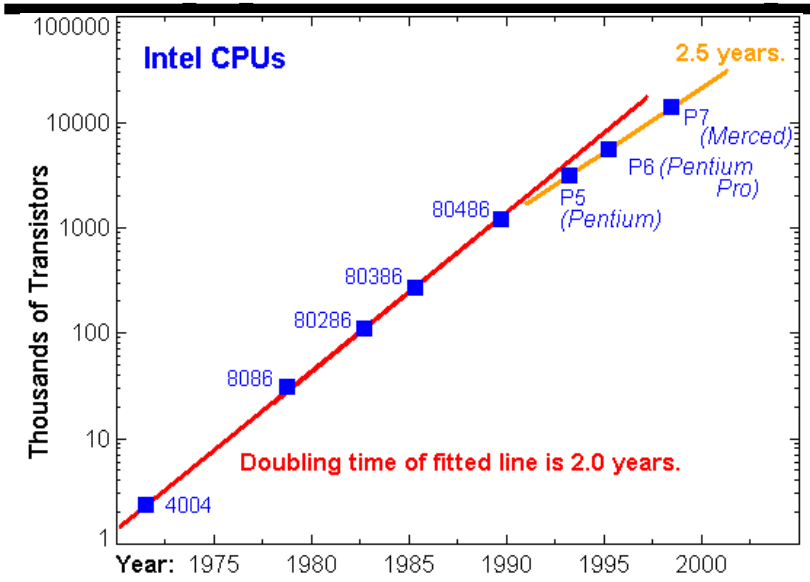
Technology Realities Necessitate Technology

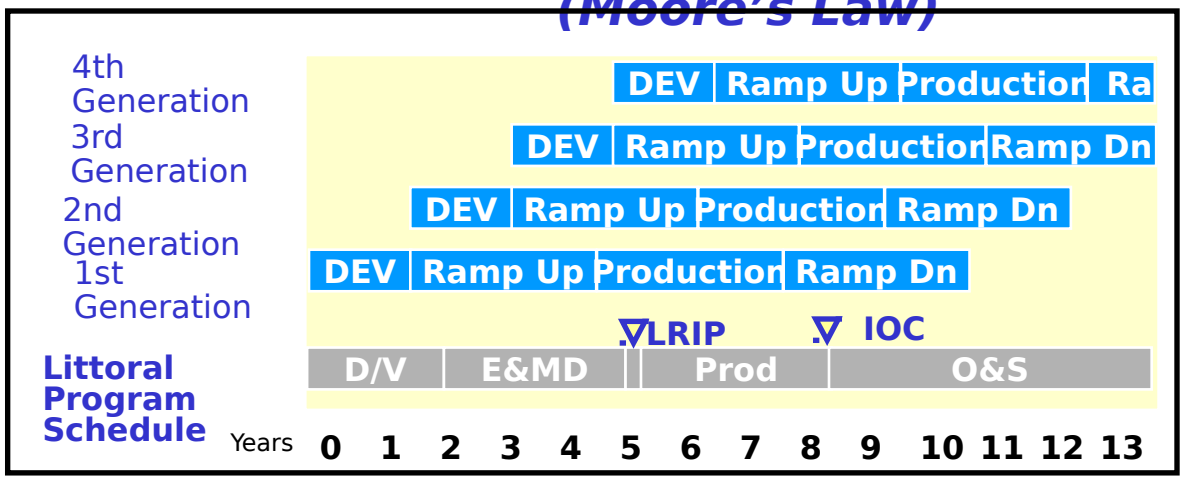


Commercial Component Reality

Commercial Environment Provides a 2 X Improvement in processing density Every 18-24 Months (Moore's Law)

E-2 Program Reality

Program Life Spans Multiple Generations of Commercial Technology



E-2C Architecture Needs Bridges Across Technology

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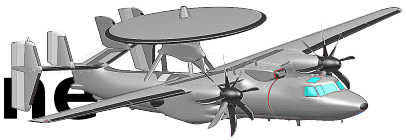
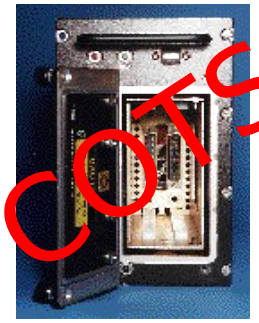
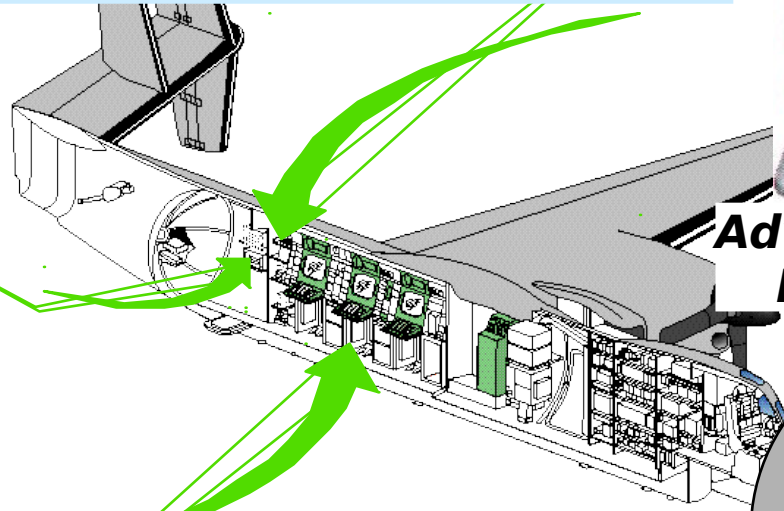
Hawkeye COTS Technology Backbone

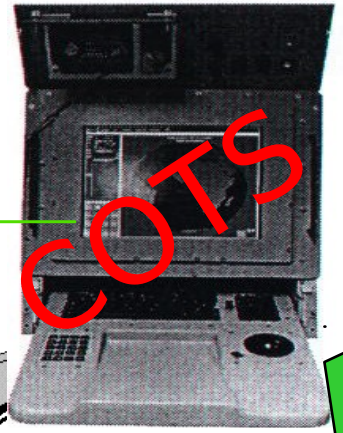


- Leveraging COTS Hardware & Software
- Designed into Hawkeye 2000

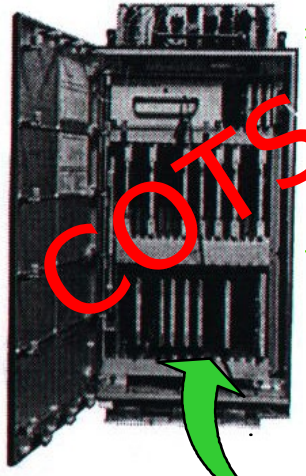


Data Loader/Recorder

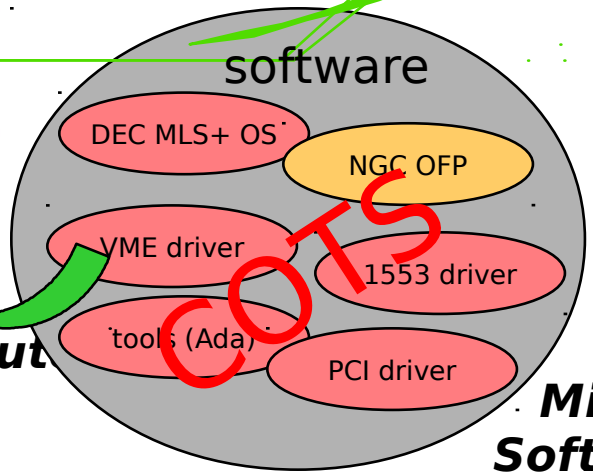


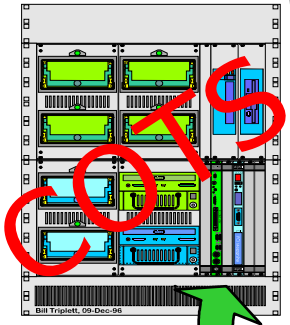


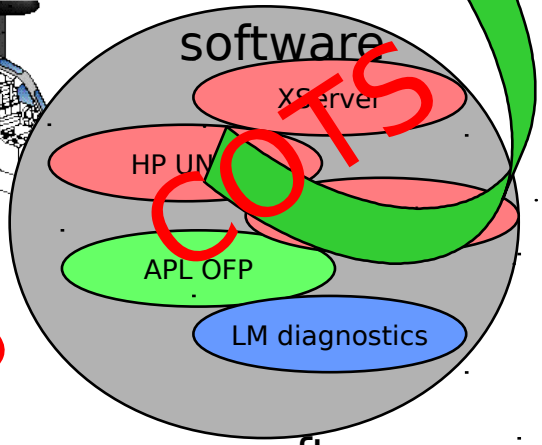
Advanced Control Indicator Set

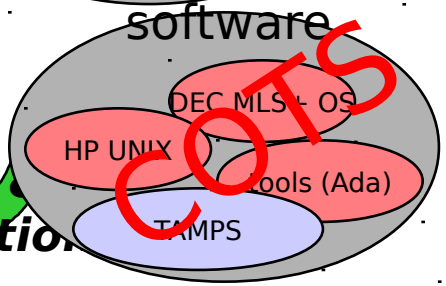


Mission Computer





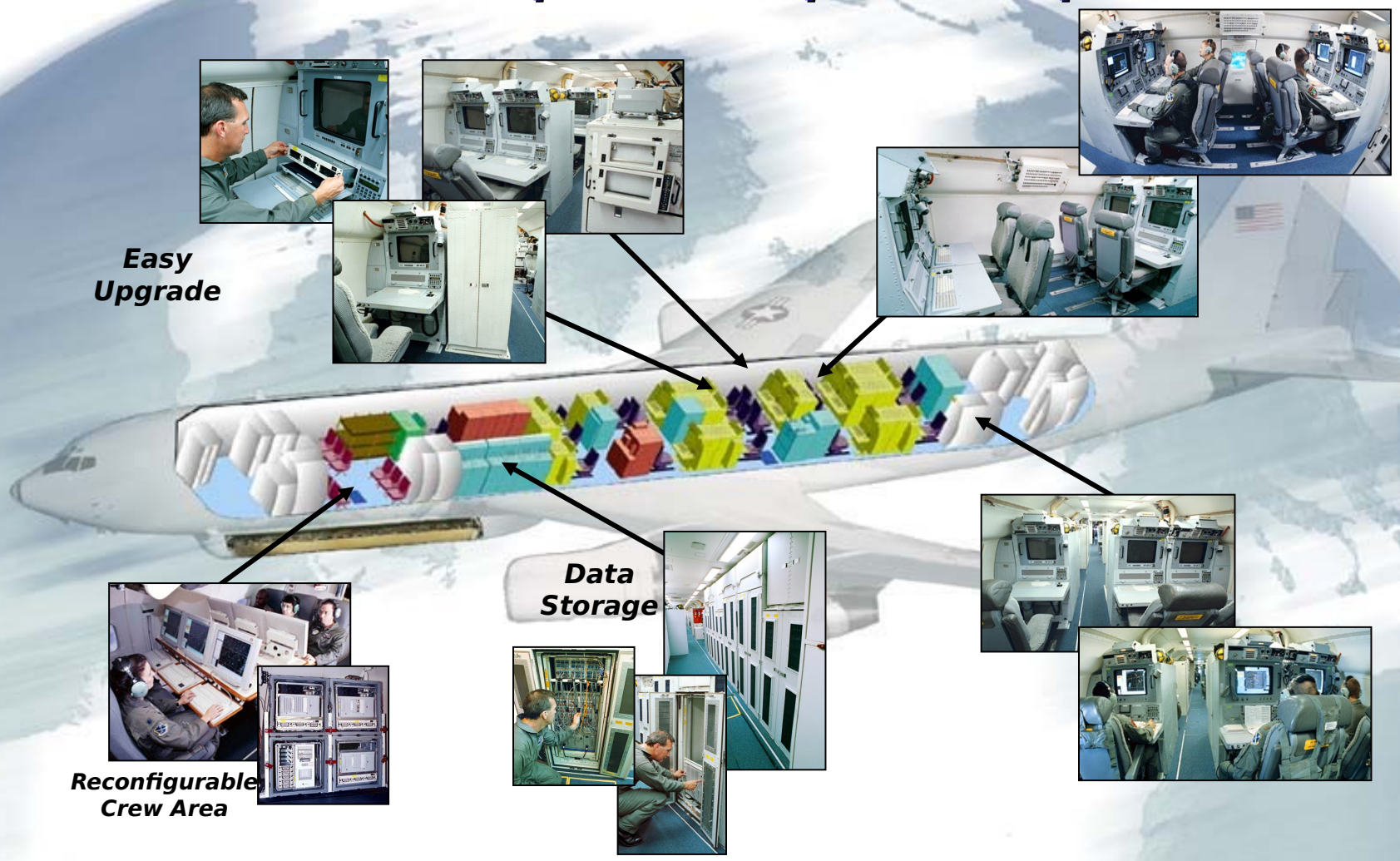




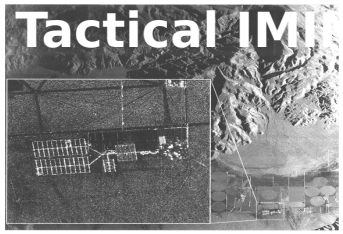
Mission Information & Software Transfer Station

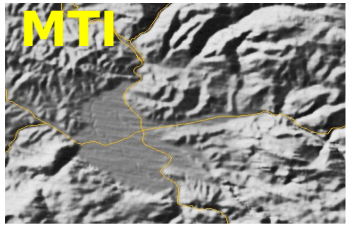
JSTARS COTS Hardware & Software

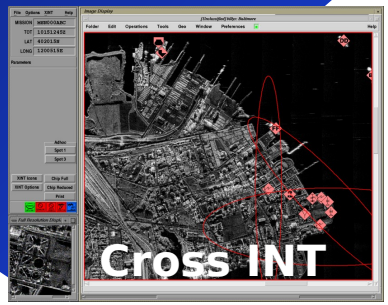
Commercial Computer, Component Replacement



Tactical Exploitation System







Commercial Processor - 2 Generations in 1.5 Years

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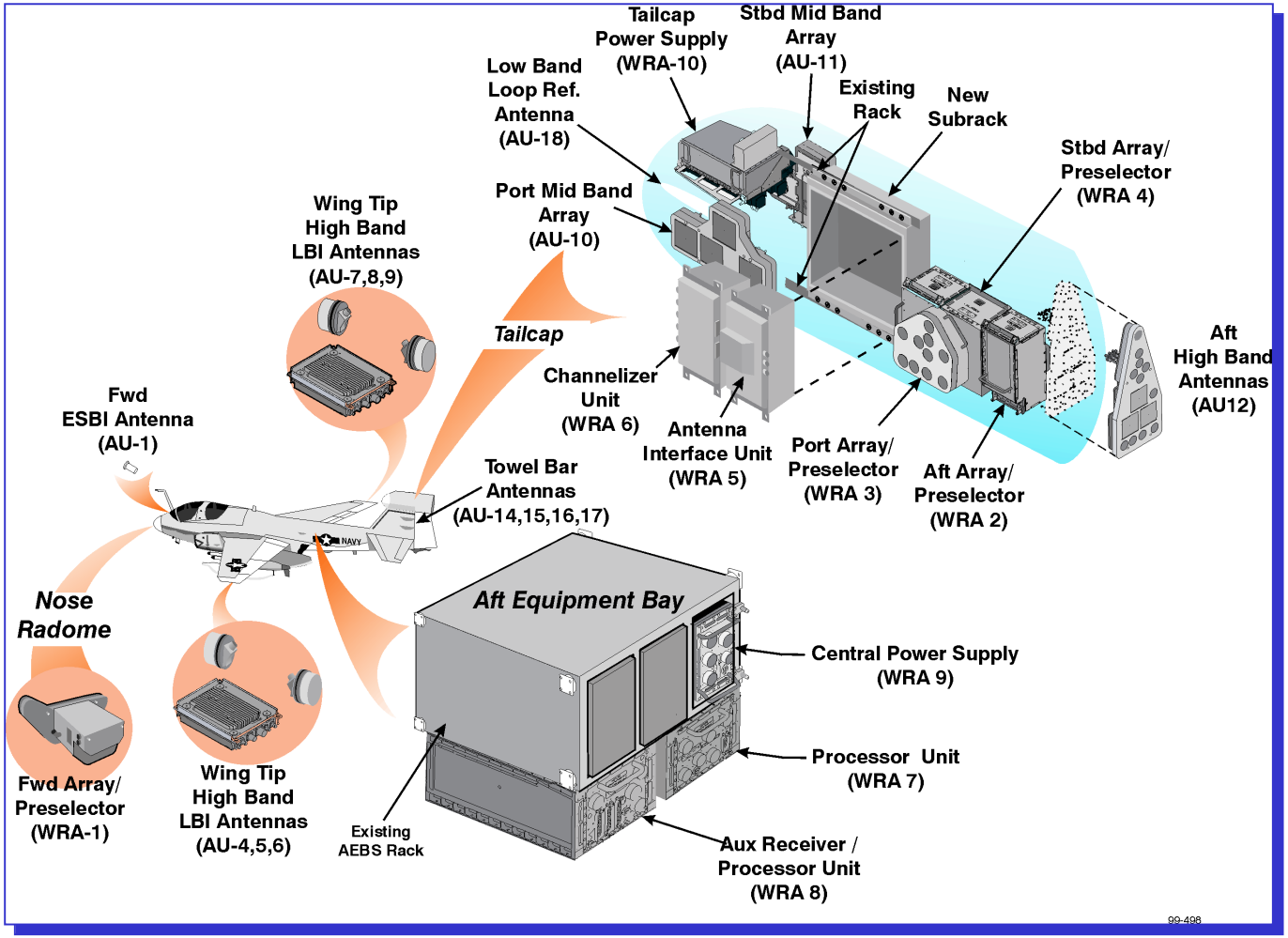
EA-6B ICAP III Spray Cooling


Tailcap Power Supply (WRA-10)
Stbd Mid Band Array (AU-11)
Low Band Loop Ref. Antenna (AU-18)
Existing Rack
New Subrack
Stbd Array/ Preselector (WRA 4)
Port Mid Band Array (AU-10)
Wing Tip High Band LBI Antennas (AU-7,8,9)
Tailcap
Aft High Band Antennas (AU12)
Channelizer Unit (WRA 6)
Antenna Interface Unit (WRA 5)
Port Array/ Preselector (WRA 3)
Aft Array/ Preselector (WRA 2)
Fwd ESBI Antenna (AU-1)
Towel Bar Antennas (AU-14,15,16,17)
Nose Radome
Aft Equipment Bay
Central Power Supply (WRA 9)
Processor Unit (WRA 7)
Fwd Array/ Preselector (WRA-1)
Wing Tip High Band LBI Antennas (AU-4,5,6)
Existing AEBS Rack
Aux Receiver / Processor Unit (WRA 8)
99-498

- **Utilize**

Spray Cooling on Selected WRAs to Improve

Reliability/ Reduce O&S Costs

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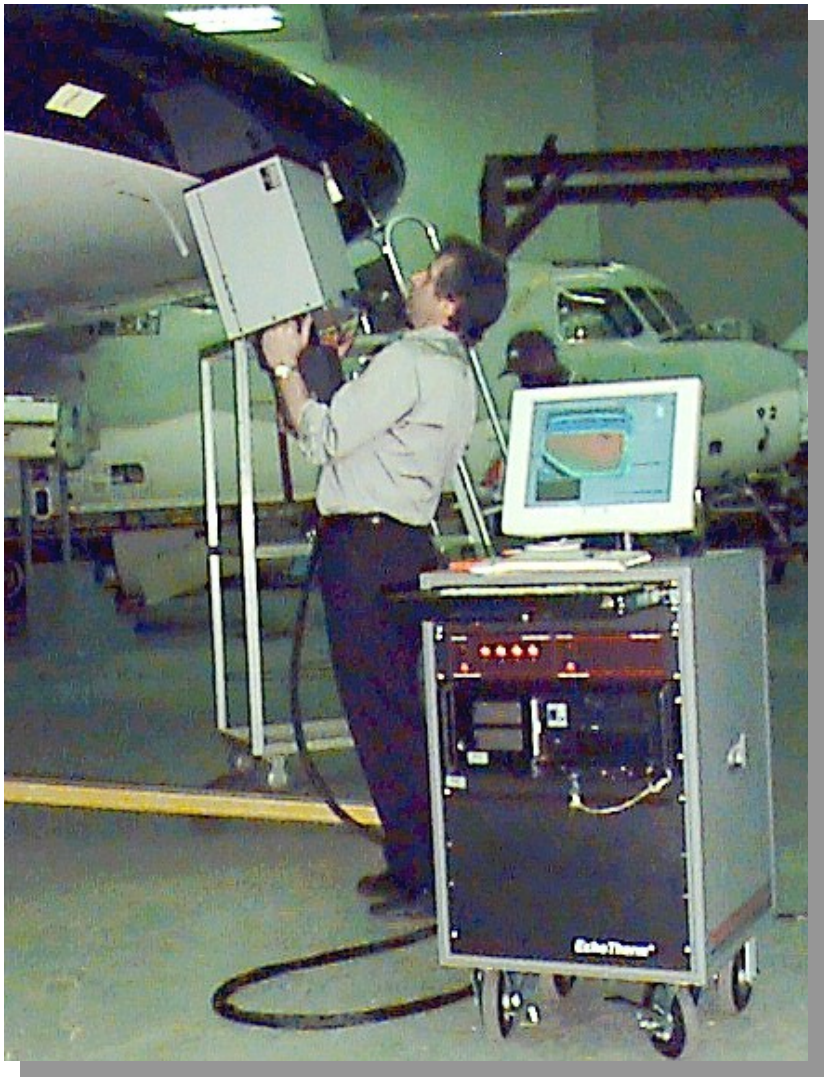
Active Thermography NDI



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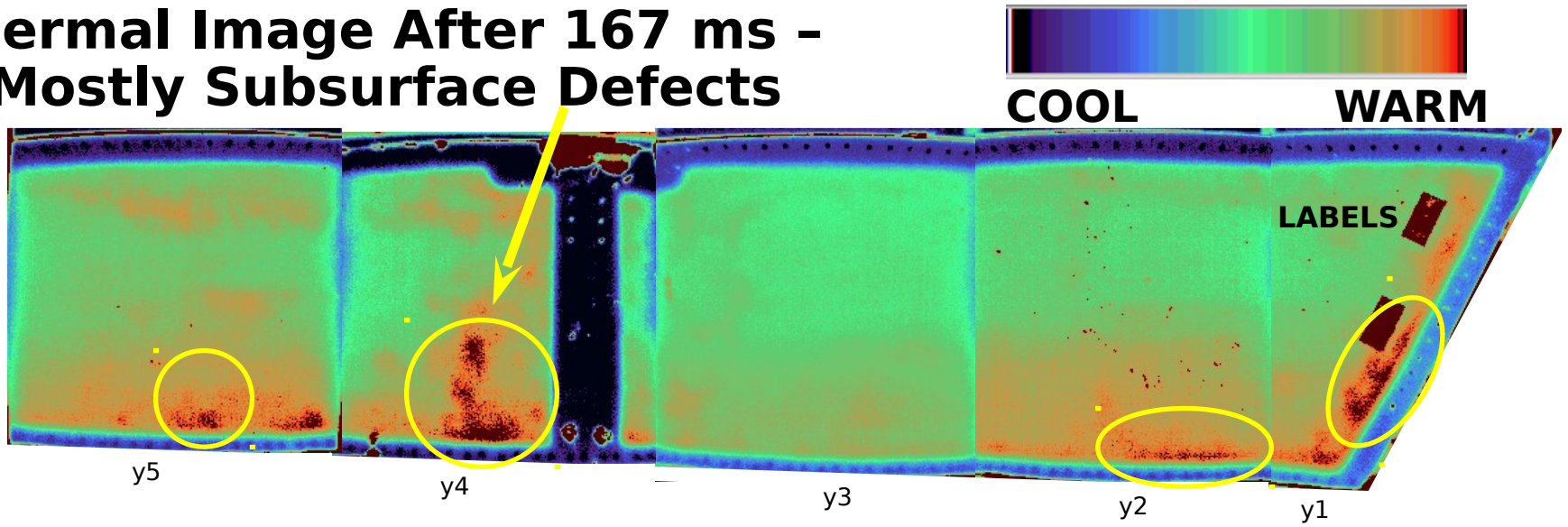
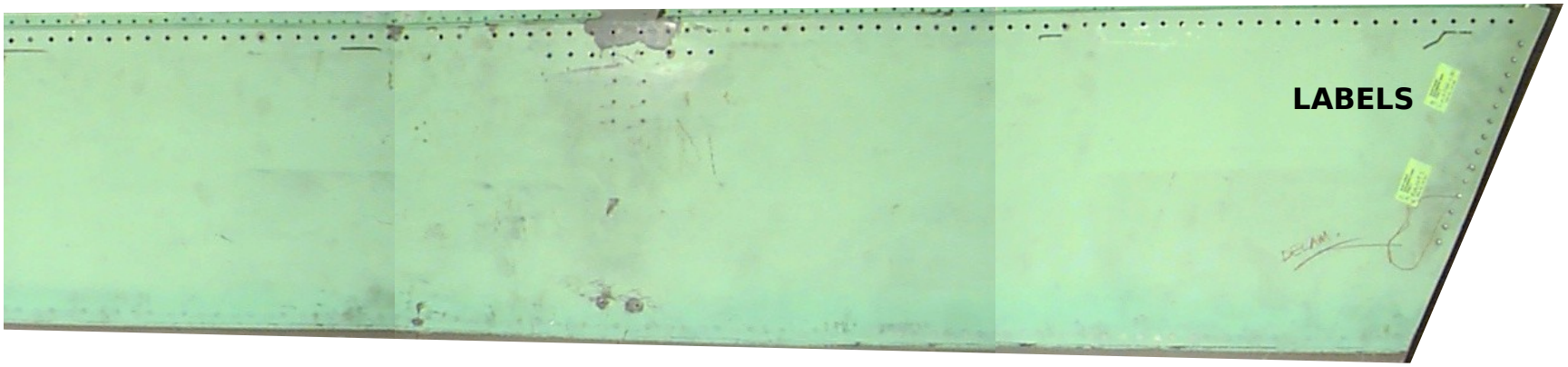
Active Thermography NDI

Thermal Image After 167 ms – Mostly Subsurface Defects





Visual Image (Montage)

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Smart Automated Wiring Analyzer (AWA)

Ruggedized, Portable Tester Designed

H2000 T/S Ruggedized Laptop **"Smart AWA"** **Cable Under Test**

H2000 T/S Cable Test Options

- ***Low Voltage Insulation Testing***
- ***TDR*** *(Automatic Distance-To-Fault Detection)*
- ***Relay Control***

- ✓ **Self-Programming – Automatically Learns Cable Wiring and Generates Cable Test Program When Connected to Cable Under Test**
- ✓ **Performs Short-Circuit Tests From *One End* of a Cable or Harness**
- ✓ **Continuity, Resistance, Shorts, Opens, Capacitor, Diode, and Missing Wire Testing**
- ✓ **Ruggedized Designed for Use in Military Organizational Level Environment**
- ✓ **Tests 512 Points in *2 Seconds***
- ✓ **Portable and Light Weight – One Person Carry**
- ✓ **Controlled by H2000 Tester or Other PC via RS 232 or Hand-Held PC**
- ✓ **Time Domain Reflectometry (TDR) Card Displays Distance to Fault to**

Unique Technology for Aircraft Maintenance

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On the Path Toward 21st Century Warfare…

Airborne
Battle Management
/
C4ISR / Strike
Systems

Platform
Centric

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On the Path Toward 21st Century Warfare...

Airborne Battle Management / C4ISR / Strike Systems

Modifying / Linking Assets to Improve Interoperability

Designing New Systems to Operate Within SoS / NCW

- SATCOM
- CREWS
- Link16
- MP-RTIP
- RMP
- CEC
- ICAP III
- LANTIRN
- SIGINT
- ELINT
- Precision Weapons
- GPS

FOSJ

ALMDS

MRE UAV

VTUAV

Sensorcraft

JSF

UCAV-N

MALD / MALI

Platform Centric

Network Centric

NORTHROP GRUMMAN

On the Path Toward 21st Century Warfare…

Airborne Battle Management / C4ISR / Strike Systems

Modifying / Linking Assets to Improve Interoperability

Designing New Systems to Operate Within SoS / NCW

Developing Innovative CONOPS To Approach Integrated BM / C4ISR / Strike

- SATCOM
- CREWS
- Link16
- MP-RTIP
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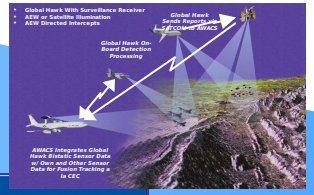
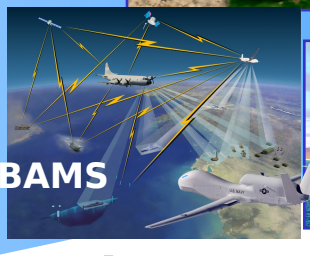


Bistatic AEW

ACN

GRS



BAMS

Littoral Surveillance & Targeting

Platform Centric

Network Centric

Integrated BM / C4ISR / Strike SoS Environment

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